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ABSTRACT

Written in 1966, the author examines the evolution of teaching in relation to the development of the elementary social studies course, Man: A Course of Study. The act of teaching is traced from play practice of primates to teaching-in-context of primitive societies to the more complex abstract teaching in separate schools of contemporary society. Five specifications about how a society must proceed in order to equip its young are noted: it must convert what is to be known into a form capable of being mastered by a beginner; the learner must be saved from needless learning; a society must place emphasis on how one derives a course of action from what one has learned; all societies must maintain interest among the young during the learning process; and a society must assure that its necessary skills and procedures remain intact from one generation to the next. The author then examines the relationship among teaching in separate schools, how a society equips its young, and the content of Man: A Course of Study. The recurring questions of what is human about human beings, how did they get to be that way, and how can they be made more so, form the structure of the course which examines the humanizing forces of tool making, language, social organization, man's prolonged childhood, and the urge to explain. Problems in constructing the course are noted in terms of the psychology of subject matter, stimulating thought in the school setting, the personalization of knowledge, and the encouragement of self-conscious reflectiveness. (KC)

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Occasional Paper No. 8

The Growth of Mind

BY

JEROME S. BRUNER

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Introduction

Occasional Paper No. 3, "Man: A Course of Study," was published in the spring of 1965. It described work then being planned and in progress for an elementary school curriculum, under the direction of Dr. Jerome S. Bruner. Since that time much has been accomplished: Several units of the course have been developed; they were taught in an ESI school during the summer of 1965 and in a Newton, Massachusetts public school during the regular school year 1965/66; a certain amount of teacher training has been undertaken for Newton teachers and for some undergraduates in a teachers' college. However, much also remains yet to be done: under the pressure of trial teaching, several units have had to be rethought and restructured; some have been dropped altogether while others have had to be added.

Nevertheless, the content of the course firmly remains Man. In the paper before us, Dr. Bruner begins not so much with a consideration of a course of study, but rather with an examination of man's evolutionary development, especially with the evolution of teaching in three ways — from play practice of primates to teaching-in-context of primitive societies to abstract teaching in separate schools. Interestingly enough, this very development of teaching and learning which Dr. Bruner discerns in human evolution, also turns out to be the substance of the course of study which he proposes for elementary school children.

The paper before us, in dealing with the growth of mind, places "Man: A Course of Study" within the more general context of the development of human learning and the concerns which this generates for psychologists. The present paper was first delivered by Dr. Bruner as the Presidential Address to the Seventy-Third Annual Convention of the American Psychological Association and is adapted from the text that appeared in the American Psychologist,* *Vol. 20, No. 12, December, 1965. In adapting it, we have tried to remain faithful to the paper while removing some of the more technical discussions and omitting the references to professional books and articles.*

When the course of study for elementary school children approaches a more nearly final version as the result of present work and future field testing, we then hope to publish a revised version of "Man: A Course of Study" to describe it.

PETER WOLFF
Editorial Director

July, 1966

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The Growth of Mind

BY JEROME S. BRUNER

What is most unique about man is that his growth as an individual depends upon the history of his species — not upon a history reflected in genes and chromosomes but, rather, reflected in a culture external to man's tissue and wider in scope than is embodied in any one man's competency. Perforce, then, the growth of mind is always growth assisted from the outside. And since a culture, particularly an advanced one, transcends the bounds of individual competence, the limits for individual growth are by definition greater than what any single person has previously attained. For the limits of growth depend on how a culture assists the individual to use such intellectual potential as he may possess. It seems highly unlikely — either empirically or canonically — that we have any realistic sense of the furthest reach of such assistance to growth.

The evidence today is that the full evolution of intelligence came as a result of bipedalism and tool using. The large human brain gradually evolved as a sequel to the first use of pebble tools by early near-man. To condense the story, a near-man, or hominid, with a slightly superior brain, using a pebble tool, could make out better in the niche provided by nature than a near-man who depended not on tools but on sheer strength and formidable jaws. Natural selection favored the primitive tool user. In time, thanks to his better chance of surviving and breeding, he became more so: The ones who survived had larger brains, smaller jaws, less ferocious teeth. In place of belligerent anatomy, they developed tools and a brain that made it possible to use them. Human evolution thereafter became less a matter of having appropriate fangs or claws and more one of using and later fashioning tools to express the powers of the larger brain that was also emerging. Without tools the brain was of little use, no matter how many hundred cubic centimeters of it there might be. Let it also be said that without the original programmatic capacity for fitting tools into a sequence of acts, early hominids would never have started the epigenetic progress that brought them to their present state. And as human groups stabilized, tools became more complex and "shaped to pattern," so that it was no longer a matter of reinventing tools in order to survive, but rather of mastering the skills necessary for using them. In short, after a certain point in human evolution, the only means whereby man could fill his evolutionary niche was through the cultural transmission of the skills necessary for the use of priorly invented techniques, implements, and devices.

Two crucial parallel developments seem also to have occurred. As hominids became increasingly bipedal, with the freed hands necessary for using spontaneous pebble tools, selection also favored those with a heavier pelvic bony

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structure that could sustain the impacting strain of bipedal locomotion. The added strength came, of course, from a gradual closing down of the birth canal. There is an obstetrical paradox here: a creature with an increasingly larger brain but with a smaller and smaller birth canal to get through. The resolution seems to have been achieved through the immaturity of the human neonate, particularly cerebral immaturity that assures not only a smaller head, but also a longer period of transmitting the necessary skills required by human culture. During this same period, human language must have emerged, giving man not only a new and powerful way of representing reality but also increasing his power to assist the mental growth of the young to a degree beyond anything before seen in nature.

It is impossible, of course, to reconstruct the evolution in techniques of instruction in the shadow zone between hominids and man. I have tried to compensate by observing contemporary analogues of earlier forms, knowing full well that the pursuit of analogy can be dangerously misleading. I have spent many hours observing uncut films of the behavior of free-ranging baboons, films shot in East Africa by my colleague Irven DeVore with a very generous footage devoted to infants and juveniles. I have also had access to the unedited film archives of a hunting-gathering people living under roughly analogous ecological conditions, the !Kung Bushmen of the Kalahari, recorded by Laurance and Lorna Marshall, brilliantly aided by their son John and daughter Elizabeth.[1]

Let me describe very briefly some salient differences in the free learning patterns of immature baboons and among !Kung children. Baboons have a highly developed social life in their troops, with well-organized and stable dominance patterns. They live within a territory, protecting themselves from predators by joint action of the strongly built, adult males. It is striking that the behavior of baboon juveniles is shaped principally by play with their peer group, play that provides opportunity for the spontaneous expression and practice of the component acts that, in maturity, will be orchestrated into either the behavior of the dominant male or of the infant-protective female. All this seems to be accomplished with little participation by any mature animals in the play of the juveniles.

Among hunting-gathering humans, on the other hand, there is *constant* interaction between adult and child, or adult and adolescent, or adolescent and child. !Kung adults and children play and dance together, sit together, participate in minor hunting together, join in song and story telling together. At very frequent intervals, moreover, children are party to rituals presided

[1] I am greatly indebted to Irven DeVore and Educational Services Incorporated for the opportunity to view his films of free-ranging baboons, and to Laurance and Lorna Marshall for the opportunity to examine their incomparable archives. DeVore and the Marshalls have been generous in their counsel as well.

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over by adults — minor, as in the first haircutting, or major, as when a boy kills his first Kudu buck and goes through the proud but painful process of scarification. Children, besides, are constantly playing imitatively with the rituals, implements, tools, and weapons of the adult world. Young juvenile baboons, on the other hand, virtually never play with things or imitate directly large and significant sequences of adult behavior.

Note, though, that in tens of thousands of feet of !Kung film, one virtually never sees an instance of "teaching" taking place outside the situation where the behavior to be learned is relevant. Nobody "teaches" in our prepared sense of the word. There is nothing like school, nothing like lessons. Indeed, among the !Kung children there is very little "telling." Most of what we would call instruction is through showing. And there is no "practice" or "drill" as such save in the form of play modeled directly on adult models — play hunting, play bossing, play exchanging, play baby tending, play house making. In the end, every man in the culture knows nearly all there is to know about how to get on with life as a man, and every woman as a woman — the skills, the rituals and myths, the obligations and rights.

The change in the instruction of children in more complex societies is twofold. First of all, there is knowledge and skill in the culture far in excess of what any one individual knows. And so, increasingly, there develops an economical technique of instructing the young based heavily on *telling* out of context rather than *showing* in context. In literate societies, the practice becomes institutionalized in the school or the "teacher." Both promote this necessarily abstract way of instructing the young. The result of "teaching the culture" can, at its worst, lead to the ritual, rote nonsense that has led a generation of critics to despair. For in the detached school, what is imparted often has little to do with life as lived in the society except insofar as the demands of school are of a kind that reflect *indirectly* the demands of life in a technical society. But these indirectly imposed demands may be the most important feature of the detached school. For school is a sharp departure from indigenous practice. It takes learning, as we have noted, out of the context of immediate action just by dint of putting it into a school. This very extirpation makes learning become an act in itself, freed from the immediate ends of action, preparing the learner for the chain of reckoning remote from payoff that is needed for the formulation of complex ideas. At the same time, the school (if successful) frees the child from the pace setting of the round of daily activity. If the school succeeds in avoiding a pace-setting round of its own, it may be one of the great agents for promoting reflectiveness. Moreover, in school, one must "follow the lesson" which means one must learn to follow either the abstraction of written speech — abstract in the sense that it is divorced from the concrete situation to which the speech might originally have been related — or the abstraction of language delivered orally but out

of the context of an ongoing action. Both of these are highly abstract uses of language.

What a cultures does to assist the development of the powers of mind of its members is, in effect, to provide amplification systems to which human beings, equipped with appropriate skills, can link themselves. There are, first, the amplifiers of action — hammers, levers, digging sticks, wheels — but more important, the programs of action into which such implements can be substituted. Second, there are amplifiers of the senses, ways of looking and noticing that can take advantage of devices ranging from smoke signals and hailers to diagrams and pictures that stop the action, or microscopes that enlarge it. Finally and most powerfully, there are amplifiers of the thought processes, ways of thinking that employ language and formation of explanation, and later use such languages as mathematics and logic and even find automatic servants to crank out the consequences. A culture is, then, a deviser, a repository, and a transmitter of amplification systems and of the devices that fit into such systems. We know very little in a deep sense about the transmission function, how people are trained to get the most from their potential by use of a culture's resources.

But it is reasonably clear that there is a major difference between the mode of transmission in a technical society, with its schools, and an indigenous one, where cultural transmission is in the context of action. It is not just that an indigenous society, when its action pattern becomes disrupted, falls apart — at a most terrifying rate — as in uncontrolled urbanization in some parts of Africa. Rather, it is that the institution of a school serves to convert knowledge and skill into more symbolical, more abstract, more verbal form. It is this process of transmission — admittedly very new in human history — that is so poorly understood and to which, finally, we shall turn.

There are certain obvious specifications that can be stated about how a society must proceed in order to equip its young. First, it must convert what is to be known — whether a skill or a belief system or a connected body of knowledge — into a form capable of being mastered by a beginner. The more we know of the process of growth, the better we shall be at such conversion. The failure of modern man to understand mathematics and science may be less a matter of stunted abilities than our failure to understand how to teach such subjects. Second, given the limited amount of time available for learning, there must be a due regard for saving the learner from needless learning. There must be some emphasis placed on economy and transfer and the learning of general rules. All societies must (and virtually all do) distinguish those who are clever from those who are stupid — though few of them generalize this trait across all activities. Cleverness in a particular activity almost universally connotes strategy, economy, heuristics, highly generalized

skills. Third, a society must also place emphasis upon how one derives a course of action from what one has learned. Indeed, in an indigenous society, it is almost impossible to separate what one does from what one knows. More advanced societies often have not found a way of dealing with the separation of knowledge and action — probably a result of the emphasis they place upon "telling" in their instruction. Fourth, all societies must maintain interest among the young in the learning process, a minor problem when learning is in the context of life and action, but harder when it becomes more abstracted. And finally, and perhaps most obviously, a society must assure that its necessary skills and procedures remain intact from one generation to the next — which does not always happen, as witnessed by Easter Islanders, Incas, Aztecs, and Mayas.

Unfortunately, psychology has not concerned itself much with any of these five requisites of cultural transmission — or at least not much with the first four of them. Only the invention of antidegradation devices, guarantors that skill and knowledge will be maintained intact, is an exception to our oversight. We psychologists have been up to our ears in it. Our special contribution is the achievement test. But the achievement test has, in the main, reflected the timidity of the educational enterprise as a whole. I believe we know how to determine, though we have not yet devised tests to determine, how pupils use what they learn to think with later in life — for there is the real issue.

I commented earlier that there was strikingly little knowledge available about the "third way" of training the skills of the young: the first being the play practice of component skills in prehuman primates, the second the teaching-in-context of indigenous societies, and the third being the abstracted, detached method of the school.

Let me now become highly specific. Let me consider a particular course of study, one given in a school, one we are ourselves constructing, trying out, and in a highly qualitative way, evaluating. It is for schools of the kind that exist in Western culture. The experience we have had with this effort, now in its third year, may serve to highlight the kinds of problems and conjectures one encounters in studying how to assist the growth of intellect in this "third way."

There is a dilemma in describing a course of study. One begins by setting forth the intellectual substance of what is to be taught. Yet if such a recounting tempts one to "get across" the subject, the ingredient of pedagogy is in jeopardy. For only in a trivial sense is a course designed to "get something across," merely to impart information. There are better means to that end than teaching. Unless the learner develops his skills, disciplines his taste, deepens his view of the world, the "something" that is got across is hardly

worth the effort of transmission. The more "elementary" a course and the younger its students, the more serious must be its pedagogical aim of forming the intellectual powers of those whom it serves. It is as important to justify a good mathematics course by the intellectual discipline it provides or the honesty it promotes as by the mathematics it transmits. Indeed, neither can be accomplished without the other.

The content of our particular course is man: his nature as a species, the forces that shaped and continue to shape his humanity. Three questions recur throughout:

What is human about human beings?
How did they get that way?
How can they be made more so?

In pursuit of our questions we explore five matters, each closely associated with the evolution of man as a species, each defining at once the distinctiveness of man and his potentiality for further evolution. The five great humanizing forces are, of course, tool making, language, social organization, the management of man's prolonged childhood, and man's urge to explain. It has been our first lesson in teaching that no pupil, however eager, can appreciate the relevance of, say, tool making or language in human evolution without first grasping the fundamental concept of a tool or what a language is. These are not self-evident matters, even to the expert. So we are involved in teaching not only the role of tools or language in the emergence of man, but, as a necessary precondition for doing so, setting forth the fundamentals of linguistics or the theory of tools. And it is as often the case as not that (as in the case of the "theory of tools") we must solve a formidable intellectual problem ourselves in order to be able to help our pupils do the same. I should have said at the outset that the "we" I employ in this context is no editorial fiction, but rather a group of anthropologists, zoologists, linguists, theoretical engineers, artists, designers, camera crews, teachers, children, and psychologists. The project is being carried out under my direction at Educational Services Incorporated, with grants from the National Science Foundation and the Ford Foundation.

While one readily singles out five sources of man's humanization, under no circumstances can they be put into airtight compartments. For example, human kinship is distinctively different from primate mating patterns precisely because it is classificatory and rests on man's ability to use language. Or, if you will, tool use enhances the division of labor in a society which in turn affects kinship. So while each domain can be treated as a separate set of ideas, their teaching must make it possible for the children to have a sense of their interaction. We have leaned heavily on the use of contrast, highly controlled contrast, to help children achieve detachment from the all too familiar matrix of social life: the contrasts of man versus higher primates,

man versus prehistoric man, contemporary technological man versus "primitive" man, and man versus child. The primates are principally baboons, the prehistoric materials mostly from the Olduvai Gorge and Les Eyzies, the "primitive" peoples mostly the Netsilik Eskimos of Pelly Bay and the !Kung Bushmen. The materials, collected for our purposes, are on film, in story, in ethnography, in pictures and drawings, and principally in ideas embodied in exercises.

We have high aspirations. We hope to achieve five goals:

1. To give our pupils respect for and confidence in the powers of their own minds
2. To give them respect, moreover, for the powers of thought concerning the human condition, man's plight, and his social life
3. To provide them with a set of workable models that make it simpler to analyze the nature of the social world in which they live and the condition in which man finds himself
4. To impart a sense of respect for the capacities and plight of man as a species, for his origins, for his potential, for his humanity
5. To leave the student with a sense of the unfinished business of man's evolution.

One last word about the course of study that has to do with the quality of the ideas, materials, and artistry — a matter that is at once technological and intellectual. We have felt that the making of such a curriculum deserved the best talent and technique available in the world. Whether artist, ethnographer, film maker, poet, teacher — nobody we have asked has refused us. We are obviously going to suffer in testing a Hawthorne effect of some magnitude. But perhaps it is as well to live in a permanent state of revolution.

Let me now try to describe some of the major problems one encounters in trying to construct a course of study. I shall not try to translate the problems into refined theoretical form, for they do not as yet merit such translation. They are more difficulties than problems. I choose them, because they are vividly typical of what one encounters in such enterprises. The course is designed for 10-year-olds in the fifth grade of elementary school, but we have been trying it out as well on the fourth and sixth grades better to bracket our difficulties.

One special point about these difficulties. They are born of trying to achieve an objective and are as much policy bound as theory bound. It is like the difference between building an economic theory about monopolistic practices and constructing policies for controlling monopoly. Let me remind you that modern economic theory has been reformulated, refined, and revived by having a season in policy. I am convinced that the psychology of assisted growth, i.e., pedagogy, will have to be forged in the policy crucible of cur-

riculum making before it can reach its full descriptive power as theory. Economics was first through the cycle from theory to policy to theory to policy; it is happening now to psychology, anthropology, and sociology.

Now on to the difficulties. The first is what might be called *the psychology of a subject matter.* A learned discipline can be conceived as a way of thinking about certain phenomena. Mathematics is one way of thinking about order without reference to what is being ordered. The behavioral sciences provide one or perhaps several ways of thinking about man and his society — about regularities, origins, causes, effects. They are probably special (and suspect) because they permit man to look at himself from a perspective that is outside his own skin and beyond his own preferences — at least for awhile.

Underlying a discipline's "way of thought," there is a set of connected, varyingly implicit, generative propositions. In physics and mathematics, most of the underlying generative propositions like the conservation theorems, or the axioms of geometry, or the associative, distributive, and commutative rules of analysis are by now very explicit indeed. In the behavioral sciences we must be content with more implicitness. We traffic in inductive propositions: e.g., the different activities of a society are interconnected such that if you know something about the technological response of a society to an environment, you will be able to make some shrewd guesses about its myths or about the things it values, etc. We use the device of a significant contrast as in linguistics as when we describe the territoriality of a baboon troop in order to help us recognize the system of reciprocal exchange of a human group, the former somehow provoking awareness of the latter.

There is nothing more central to a discipline than its way of thinking. There is nothing more important in its teaching than to provide the child the earliest opportunity to learn that way of thinking — the forms of connection, the attitudes, hopes, jokes, and frustrations that go with it. In a word, the best introduction to a subject is the subject itself. At the very first breath, the young learner should, we think, be given the chance to solve problems, to conjecture, to quarrel as these are done at the heart of the discipline. But, you will ask, how can this be arranged?

Here again the problem of conversion. There exist ways of thinking characteristic of different stages of development. We are acquainted with Inhelder and Piaget's account of the transition from preoperational, through concrete operational, to propositional thought in the years from preschool through, say, high school. If you have an eventual pedagogical objective in mind, you can translate the way of thought of a discipline into its Piagetian (or other) equivalent appropriate to a given level of development and take the child onward from there. The Cambridge Mathematics Project of Educational Services Incorporated argues that if the child is to master the calculus early in his high school years, he should start work early with the idea of limits,

the earliest work being manipulative, later going on to images and diagrams, and finally moving on to the more abstract notation needed for delineating the more precise idea of limits.

In "Man: A Course of Study," I have indicated versions of the subject appropriate to a particular age that can at a later age be given a more powerful rendering. We have tried to choose topics with this in mind: The analysis of kinship that begins with children using sticks and blocks and colors and whatnot to represent their own families, goes on to the conventional kinship diagrams by a meandering but, as you can imagine, interesting path, and then can move on to more formal and powerful componential analysis. So, too, with myth. We begin with the excitement of a powerful myth (like the Netsilik Nuliajik myth), then have the children construct some myths of their own, then examine what a set of Netsilik myths have in common, which takes us finally to Lévi-Strauss's analysis of contrastive features in myth construction. A variorum text of a myth or corpus of myths put together by sixth graders can be quite an extraordinary document.

This approach to the psychology of a learned discipline turns out to illuminate another problem raised earlier: the maintenance of interest. There is, in this approach, a reward in understanding that grows from the subject matter itself. It is easier to engineer this satisfaction in mathematics, for understanding is so utter in a formal discipline — a balance beam balances or it does not; therefore there is an equality or there is not. In the behavioral sciences the payoff in understanding cannot be so obviously and startlingly self-revealing. Yet, one can design exercises in the understanding of man, too — as when children figure out the ways in which, given limits of ecology, skills, and materials, Bushmen hunt different animals, and then compare their predictions with the real thing on film.

Consider now a second problem: *how to stimulate thought in the setting of a school.* We know from experimental studies that there is a striking difference in the acts of a person who thinks that the task before him represents a problem to be solved rather than being controlled by random forces. School is a particular subculture where these matters are concerned. By school age, children have come to expect quite arbitrary and, from their point of view, meaningless demands to be made upon them by adults — the result, most likely, of the fact that adults often fail to recognize the task of conversion necessary to make their questions have some intrinsic significance for the child. Children, of course, will try to solve problems if they recognize them as such. But they are not often either predisposed to or skillful in problem finding, in recognizing the hidden conjectural feature in tasks set them. But we know now that children in school can quite quickly be led to such problem finding by encouragement and instruction.

The need for this instruction and encouragement and its relatively swift

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success relates, I suspect, to what psychoanalysts refer to as the guilt-ridden oversuppression of primary process and its public replacement by secondary process. Children, like adults, need reassurance that it is all right to entertain and express highly subjective ideas, to treat a task as a problem where you *invent* an answer rather than *finding* one out there in the book or on the blackboard. With children in elementary school, there is often a need to devise emotionally vivid special games, story-making episodes, or construction projects to reestablish in the child's mind his right not only to have his own private ideas but to express them in the public setting of a classroom.

But there is another, perhaps more serious difficulty: the interference of intrinsic problem solving by extrinsic problem solving. Young children in school expend extraordinary time and effort figuring out what it is that the teacher wants — and usually coming to the conclusion that she or he wants tidiness or remembering or to do things at a certain time in a certain way. This I refer to as extrinsic problem solving. There is a great deal of it in school.

There are several quite straightforward ways of stimulating problem solving. One is to train teachers to want it and that will come in time. But teachers can be encouraged to like it, interestingly enough, by providing them and their children with materials and lessons that *permit* legitimate problem solving and permit the teacher to recognize it. For exercises with such materials create an atmosphere by treating things as instances of what *might* have occurred rather than simply as what did occur. Let me illustrate by a concrete instance. A fifth-grade class was working on the organization of a baboon troop — on this particular day, specifically on how they might protect against predators. They saw a brief sequence of film in which six or seven adult males go forward to intimidate and hold off three cheetahs. The teacher asked what the baboons had done to keep the cheetahs off, and there ensued a lively discussion of how the dominant adult males, by showing their formidable mouthful of teeth and threatening gestures, had turned the trick. A boy raised a tentative hand and asked whether cheetahs always attacked together. Yes, though a single cheetah sometimes followed behind a moving troop and picked off an older, weakened straggler or an unwary, straying juvenile. "Well, what if there were four cheetahs and two of them attacked from behind and two from in front. What would the baboons do then?" The question could have been answered empirically — and the inquiry ended. Cheetahs *do not* attack that way, and so we do not know what baboons *might* do. Fortunately, it was not. For the question opens up the deep issues of what might be and why it is not. Is there a necessary relation between predators and prey that share a common ecological niche? Must their encounters have a "sporting chance" outcome? It is such conjecture, in this case quite unanswerable, that produces rational, self-consciously problem-

finding behavior so crucial to the growth of intellectual power. Given the materials, given some background and encouragement, teachers like it as much as the students.

I should like to turn now to the *personalization of knowledge*. A generation ago, the progressive movement urged that knowledge be related to the child's own experience and brought out of the realm of empty abstractions. A good idea was translated into banalities about the home, then the friendly postman and trashman, then the community, and so on. It is a poor way to compete with the child's own dramas and mysteries. A decade ago, my colleague Clyde Kluckhohn wrote a prize-winning popular book on anthropology with the entrancing title *Mirror for Man*. In some deep way, there is extraordinary power in "that mirror which other civilizations still hold up to us to recognize and study . . . [the] image of ourselves" (Lévi-Strauss).[3] The psychological bases of the power are not obvious. Is it as in discrimination learning, where increasing the degree of contrast helps in the learning of a discrimination, or as in studies of concept attainment where a negative instance demonstrably defines the domain of a conceptual rule? Or is it some primitive identification? All these miss one thing that seems to come up frequently in our interviews with the children. It is the experience of discovering kinship and likeness in what at first seemed bizarre, exotic, and even a little repellant.

Consider two examples, both involving film of the Netsilik. In the films, a single nuclear family, Zachary, Marta, and their 4-year-old Alexi, is followed through the year — spring sealing, summer fishing at the stone weir, fall caribou hunting, early winter fishing through the ice, winter at the big ceremonial igloo. Children report that at first the three members of the family look weird and uncouth. In time, they look normal, and eventually, as when Marta finds sticks around which to wrap her braids, the girls speak of how pretty she is. That much is superficial — or so it seems. But consider a second episode.

It has to do with Alexi who, with his father's help, devises a snare and catches a gull. There is a scene in which he stones the gull to death. Our children watched, horror struck. One girl, Kathy, blurted out, "He's not even human, doing that to the seagull." The class was silent. Then another girl, Jennine, said quietly: "He's got to grow up to be a hunter. His mother was smiling when he was doing that." And then an extended discussion about how people have to do things to learn and even do things to learn how to feel appropriately. "What would you do if you had to live there? Would you be as smart about getting along as they are with what they've got?" said

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[3] Anthropology: Its achievements and future. Lecture presented at Bicentennial Celebration, Smithsonian Institution, Washington, D.C., September, 1965.

one boy, going back to the accusation that Alexi was inhuman to stone the bird.

I am sorry it is so difficult to say it clearly. What I am trying to say is that to personalize knowledge one does not simply link it to the familiar. Rather one makes the familiar an instance of a more general case and thereby produces awareness of it. What the children were learning about was not seagulls and Eskimos, but about their own feelings and preconceptions that, up to then, were too implicit to be recognizable to them.

Consider finally the problem of *self-conscious reflectiveness*. It is an epistemological mystery why traditional education has so often emphasized extensiveness and coverage over intensiveness and depth. We have already commented on the fact that memorizing was usually perceived by children as one of the high-priority tasks but rarely did children sense an emphasis upon ratiocination with a view toward redefining what had been encountered, reshaping it, reordering it. The cultivation of reflectiveness, or whatever you choose to call it, is one of the great problems one faces in devising curriculum. How lead children to discover the powers and pleasures that await the exercise of retrospection?

Let me suggest one answer that has grown from what we have done. It is the use of the "organizing conjecture." We have used three such conjectures — what is human about human beings, how they got that way, how they could become more so. They serve two functions, one of them the very obvious though important one of putting perspective back into the particulars. The second is less obvious and considerably more surprising. The questions often seemed to serve as criteria for determining where they were getting, how well they were understanding, whether anything new was emerging. Recall Kathy's cry: "He's not human doing that to the seagull." She was hard at work in her rage on the conjecture what makes human beings human.

There, in brief, are four problems that provide some sense of what a psychologist encounters when he takes a hand in assisting the growth of mind in children in the special setting of a school. The problems look quite different from those we encounter in formulating classical developmental theory with the aid of typical laboratory research. They also look very different from those that one would find in an indigenous society, describing how children picked up skills and knowledge and values in the context of action and daily life. We clearly do not have a theory of the school that is sufficient to the task of running schools — just as we have no adequate theory of toys or of readiness building or whatever the jargon is for preparing children to do a better job the next round. It only obscures the issue to urge that some day our classical theories of learning will fill the gap. They show no sign of doing so.

I hope that we shall not allow ourselves to be embarrassed by our present ignorance. It has been a long time since we have looked at what is involved in imparting knowledge through the vehicle of the school — if ever we did look at it squarely. I urge that we delay no longer.

But I am deeply convinced that the psychologist cannot alone construct a theory of how to assist cognitive development and cannot alone learn how to enrich and amplify the powers of a growing human mind. The task belongs to the whole intellectual community: the behavioral scientists and the artists, scientists, and scholars who are the custodians of skill, taste, and knowledge in our culture. The special task of psychologists is to convert skills and knowledge to forms and exercises that fit growing minds — and it is a task ranging from how to keep children free from anxiety and how to translate physics for the very young child into a set of playground maneuvers that, later, the child can turn around upon and convert into a sense of inertial regularities.

Psychology, and you will forgive me if the image seems a trifle frivolous, thrives on polygamy with her neighbors. Its marriage with the biological sciences has produced a cumulation of ever more powerful knowledge. So, too, have its joint undertakings with anthropology and sociology. Joined together with a variety of disciplines, psychology has made lasting contributions to the health sciences and, I judge, will make even greater contributions now that the emphasis is shifting to the problems of alleviating stress and arranging for a community's mental health. What I find lacking is an alignment that might properly be called the growth sciences. The field of pedagogy is one participant in the growth sciences. Any field of inquiry devoted to assisting the growth of effective human beings, fully empowered with zest, with skill, with knowledge, with taste is surely a candidate for this sodality. My friend Philip Morrison once suggested to his colleagues at Cornell that his department of physics grant a doctorate not only for work in theoretical, experimental, or applied physics, but also for work in pedagogical physics. The limits of the growth sciences remain to be drawn. They surely transcend the behavioral sciences cum pediatrics. It is plain that, if we are to achieve the effectiveness of which we as human beings are capable, there will one day have to be such a field. I hope that psychologists can earn their way as charter members.